

The Resolve to Dissolve

Jack Harrar

Harrar was one of the radiochemists at Livermore who analyzed the air samples collected by people, like Ed Fleming in the previous story, during the atmospheric tests in the Pacific.

In 1962, because the Soviets had resumed nuclear testing, the U.S. nuclear labs scheduled one last extensive test series in the South Pacific. It was the last because of the subsequent Limited Nuclear Test Ban Treaty. For the one and only time in my career as a chemist, I became directly involved in nuclear testing work. Those of us who remained at the Lab had to help process the debris samples that were collected after each test. These samples were collected by aircraft flying through the mushroom clouds after each test. By careful analysis of the particles collected, the radiochemists could calculate the results of the detonation.

After a detonation, the test samples, in the form of large filter papers, were flown back from the Pacific to Travis

Air Force Base and then transported to the Lab. The samples arrived in Livermore around midnight, and crews of about 12 people were assigned to perform the dissolving.

Every step of the operation was performed as quickly as possible to preserve the short-lived isotopes, which held the useful information. This naturally made the samples highly radioactive and very hazardous to handle. To analyze the samples, we first had to completely dissolve them in a procedure using perchloric acid.

Each chemist/dissolver was assigned one filter paper to dissolve. The dissolving process took 6 to 8 hours, and the more skilled you were, the faster you got it done. The faster you did it, the better the measurements would be. In addition, a shorter time meant you were exposed to less radiation.

I was called upon to dissolve filters three times during this period, and it wasn't much fun. The combination of working all night and getting tired,

together with the pressure of trying to work as fast as possible under awkward conditions in a glove box, with a tricky chemical procedure—all the while being exposed to radiation—is something all of us never forgot.



Jack Harrar.

An island epilogue

Livermore employees are still traveling to the Pacific islands, but not for the purpose of testing nuclear weapons. Rather, since 1972, they have regularly traveled to the Bikini and Eniwetok Atolls to study the extent of radioactive fallout and to assist in remediation work. Their work had three purposes: (1) to determine the radiological conditions at the atolls; (2) based on this data, to develop assessments of the radiological dose people would receive if they returned to live at the atolls; and (3) to determine when it was safe for the islanders, relocated from the islands in 1946 and 1947, to return to their homes.

Bill Robison, now retired, was actively involved in taking data that would determine whether the residents could start to return home. Starting in 1973, more than 100,000 samples were taken over the years, a real challenge according to Robison, to do so far from the Laboratory. But, as Robison will testify, "The

greater challenge was the interaction with the communities. It took a long time to develop a trust with the people where they would believe our data and what we were telling them. Eventually, we got to know some of the people really well, and brought the mayors and the council members back here to the Lab. We brought them back to see all of the equipment and all of the work that our people did here. Then they could see for themselves that we were caring people with really state-of-the-art equipment. Things had changed over the years."

Eniwetok residents moved back to the southern part of Eniwetok in 1979, and continue to reside in the southern portion. And although Bikini residents have not permanently relocated back to the island, the ships sunk as part of the early tests were cleared for commercial diving activities a few years ago and have become a mecca for scuba divers.

Thanks to Bill Robison and Carol Stoker for their information.

Cannikin by the Skin of Our Teeth

From an interview with James Edward Carothers

Carothers recalls, "Right up until hours of the shot, we didn't know whether it was going to be fired or not." But the Cannikin event at Amchitka Island, Alaska, was successfully detonated at 11:00 a.m. on November 6, 1971. Cannikin was a massive undertaking involving hundreds of Laboratory employees and nearly five years of effort.

The Cannikin event in 1971 was an event which aroused worldwide interest and controversy. Canadian groups protested, Japanese groups protested, lots of U.S. groups protested, the Aleuts protested. There were lawsuits and injunctions to prevent the shot. Right up until hours of the shot, we didn't know whether it was going to be fired or not.

There are lots of things you need to do to get ready for a big shot like this. Well, the weather decided to be weather and we had seventy- and eighty-knot winds gusting up to ninety to one hundred knots. If you have ever tried to walk around in an eighty-mile-an-hour wind, you know it's difficult. If you face into the wind you can kind of hunker down and toughen, and you can push your way forward. If you turn around and walk downwind, you are very apt to get blown over. So, we had a lot of work to do on d-minus one (the day before the shot). We wanted to move the trailers out of the trailer park. They tried to move one and it blew over. So we made a decision: "Leave them, we will sacrifice them if we have to, but don't try to move them." Four by eight sheets of plywood were blowing around like leaves. But in some ways, Cannikin was great. You could walk into any room, and no matter how scrungy and ugly you looked, there was somebody in the room that was worse.

One day, Atomic Energy Commission Chairman James Schlesinger was on the phone to somebody at the White House. I was scientific advisor to the test manager. We were clicking along and we got down to minus six minutes. I had a bunch of phones, one of which was red that connects to the control room. At minus six minutes, my red phone rang and I picked it up. It was Phil Coyle. Both of us were as cool and calm as we can be, considering our nerves were just about to snap. Phil said, "We just sent the signal to turn on the power supply down there, and every alarm in this room went off."

We talked about it. That meant the power supplies didn't go on. Although I was the only person who could do it, I did not want, at that moment, to be the one to say, "Stop the count. And by the way Mr. Schlesinger, we're having a small problem here."

Phil said, "But we've got two minutes before we charge the x units.*"

"Well, why don't we wait?"

"It could have just been the monitor, maybe the power supplies really came on and the monitor didn't work."

He and I chatted, and we got to minus four minutes.

"Hey," he says, "We just sent the signal and by God they came right up."

"Whew, that's good," I answered.

At four minutes the x units came up, at two minutes we fired the squibs**, at zero time we fired the device. But it was a queasy couple of minutes there.

*term for discharge unit.

**small explosives that open gas valves prior to detonation.

Below: Phil Coyle gets a haircut by AEC Commissioner James Schlesinger at the Cannikin event as a reward for getting the shot off on time.



Right: An aerial photo of the Cannikin site on Amchitka Island, Alaska.

